CMPT 111 Midterm Exam
February 25, 2004

50 Minutes. 20 questions. 100 marks. Open book. Please use a pen or a dark pencil and write legibly.

Name: Student Number:

Section 1: Multiple Choice. Each question is worth 3 marks.

1. Given 5 bits, how many distinct values can be represented?
    a. 5
    b. 15
    c. 20
    d. 24
    e. 32

2. A Java program can best be described as
    a. hardware
    b. software
    c. RAM
    d. ROM
    e. input

3. This is a legal variable name in Java:
    a. 2foryou2forme
    b. hello-world!
    c. hello_class
    d. class
    e. None of the above are legal.

4. The statement

```
System.out.println("Total" + 4 + 5 + 6);
```

will produce the following output:

a. Total 456

b. Total456

c. Total 15

d. Total15

e. The line will not compile due to errors.

5. The statements

```
int a = 10;
int b = 5;
int s = 3*(-a+1)/b;
```

will put the following value in s:

a. -6

b. -5

c. -3

d. 6

e. The statements will not compile due to errors.

6. Suppose we have
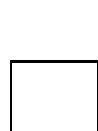
```
new String s = "University of Saskatchewan";
```

Then s.charAt[1] will return

a. 'U'

b. "University"

c. "U"

d. 'n'

e. 'u'

7. A cast is required in which of the following situations?

a. Using charAt to get part of a string and put it in a char

b. Storing an int in a float

c. Storing a float in a double

d. Storing a float in an int

e. All of the above require casts

8. In what phase of software development would you expect the classes and objects to be defined?

a. Requirements phase
b. Design phase
c. Implementation phase
d. Testing phase
e. Could appear in any of the above

9. Consider the following code fragment:

```
int a = 6;
if (a >= 6)
    a++;
else
    a--;
```

What will be the value of a at the end?

a. 0
b. 5
c. 6
d. 7
e. We will not get to the end because of errors in the code

10. Consider the following code fragment:

```
int x = 1;
while (x < 100)
    x *= 2;
```

What will be the value of x at the end?

a. 100
b. 101
c. 64
d. 128
e. We will never reach the end, because it's an infinite loop

11. Consider the following code fragment:

```
int x = 10;
do {
   System.out.println(x);
   x--;
}
while (x > 0);
```

How many times will the loop body execute?

        a. 0
        b. 1
        c. 9
        d. 10
        e. 11

12. Consider the following code fragment:

```
int x = 0;
for (x = 10; x > 20; x++)
   {
       System.out.println(x);
   }
```

How many times will the loop body execute?

        a. 0
        b. 1
        c. 9
        d. 10
        e. 11

13. The Java operator for making a new instance of a class is called

        a. new
        b. instance
        c. class
        d. constructor
        e. It is called something different for every class.

14. We would declare an instance variable to be public when
   a. We want to let others know its value
   b. We want to allow others to change its value
   c. We are providing a service to a client object
   d. We want to enforce encapsulation
   e. We should not declare an instance variable to be public

15. We have defined a method according to the following header:

```
public void myMethod(int x, int y)
```

Which of the following is a legal call to myMethod?
   a. myMethod(0);
   b. myMethod(0.0, 0.2);
   c. myMethod(2+8, 6/3);
   d. int x = myMethod(1, 2);
   e. None of the above calls are legal.

Section 2: Short Answer. If you do not know the answer to a question, write "I do not know the answer" and nothing else, and you will receive 20% of the available marks.

16. [10] Write code which takes a string called "input", and modifies it as follows: moves the first letter to the end; capitalizes the first letter; converts the remainder of the string (after the first letter) to lower case. The modified string should be stored in a variable called "output".
For example,
Input: cmpt   Output: Tcmp
Input: SASKATOON   Output: Askatoons

17. [15] Write a compact piece of code which uses a for loop to print out the first 100 multiples of 3 (i.e., 3, 6, 9, ...). The program should print out 10 lines with 10 numbers on each line.

18. [15] Consider the following program which is full of errors. Mark directly on the program the locations of five errors, and write a few words about why each is an error.

```java
public class ManyErrors
{
    private int howmanyIfound;

    public static void main(String[] myargs)
    {
        final int a = 5;
        int b = 7;
        float c = 0.0;
        BufferedReader kb =
                new BufferedReader(new InputStreamReader(System.in));
        /* now we can read input from the keyboard
        while (b > 1.0);
            {
                String s = kb.readLine();
                System.out.println(s.length);
                b++;
                a = b/3;
                c = a/3.0;
                if (c > 1.0)
                    b -= 10;
            }
    }
}
```

19. [15] Consider the following piece of code.

```
int a = 0, b = 0, c = 0;
while (a < 10)
   {
      a += 3;

      if (a > 5)
         b++;
      else
         b *= 2;

      if (b > 0)
        c += b*2;

   }
```

What are the values of a, b, and c when the loop terminates?

20. [15] Write a method, named "LargestOfThree", which takes in three ints as input and returns the largest of the three of them.